

WHAT IS CLAIMED IS:

1. A lathe assembly comprising:

a base unit having first and second longitudinal ends;

a headstock assembly comprising a housing and a spindle shaft assembly extending therethrough and rotatably mounted thereto, said spindle shaft having a longitudinal axis;

a first bedway defined on said base unit for selectively receiving at least one of a tailstock and a tool rest assembly, said first bedway generally extending from said headstock assembly toward said second end of said base unit, said first bedway having a longitudinal axis parallel to the longitudinal axis of the spindle;

a shaft locking assembly secured to said spindle shaft for selectively locking said spindle shaft with respect to said housing at 90 degree intervals; and

an indexing assembly for angularly positioning and holding said spindle shaft with respect to said housing at any one of a plurality of intervals intermediate said 90 degree intervals of said shaft locking assembly, said indexing assembly including an indexing component fixedly secured to said spindle shaft and an indexing pin mounted to said housing of said headstock assembly.

2. A lathe assembly as in claim 1, wherein said indexing component has a plurality of indexing points defined about an outer peripheral surface thereof for receiving a tip of said indexing pin.

3. A lathe assembly as in claim 2, wherein said indexing component comprises an indexing disk fixedly secured to said spindle shaft and an indexing ring detachably secured to said indexing disk, said indexing ring being formed in two parts, and wherein said indexing points comprise recesses defined in an outer peripheral surface of said indexing ring.

4. A lathe assembly as in claim 1, wherein said indexing pin is spring urged inwardly of said housing, towards said indexing component.

5. A lathe assembly as in claim 4, wherein an indexing pin housing is defined in the wall of the headstock housing for slidably receiving said indexing pin, and wherein a projecting stop is provided on said indexing pin for selectively engaging one of two slots in said indexing pin housing to define an engaged and a disengaged position of said indexing pin with respect to said indexing component.

6. A lathe assembly as in claim 1, further comprising a second bed assembly operatively coupled to at least one of said first and second longitudinal ends of said base unit, said second bed assembly including a second bedway for selectively receiving at least one of a tailstock and a tool rest assembly, said second bedway being axially aligned with said first bedway.

7. A lathe assembly as in claim 6, further comprising a tool rest assembly selectively slidably disposed in one of said first bedway and said second bedway, and a locking assembly for selectively locking said tool rest assembly to said bedway,

8. A lathe assembly as in claim 7, wherein said tool rest assembly includes a tool support housing extending vertically from a tool rest main body, said tool rest main body comprising a tool rest housing and a locking assembly for selectively locking said tool rest housing to the bedway, said locking assembly including a locking plate for engaging an undersurface of the bedway; a slider block seated and disposed within said tool rest housing, a non-circular locking shaft extending longitudinally of said housing and disposed through a bore in said slider block, and a locking piston vertically slidably disposed in said slider block, said locking piston having a bore for being aligned with said bore of said slider block to receiving said locking shaft

and having a shaft for being detachably mounted to said locking plate, whereby rotation of said locking shaft about the longitudinal axis thereof lifts said locking piston and the locking plate mounted thereto while pressing said block so as to clamp said housing to the bedway.

9. A lathe assembly as in claim 1, further comprising a first tailstock assembly selectively slidably disposed in said first bedway, said first tailstock assembly including a quill housing portion having a quill assembly rotatably disposed therein and axially aligned with said spindle shaft of said headstock assembly.

10. A lathe assembly as in claim 9, wherein at least one of the quill housing portion of the first tailstock assembly and a portion of the headstock assembly housing the spindle shaft is generally elliptically shaped in longitudinal section and generally circularly shaped in transverse cross section so as to define a generally continuously curved outer peripheral surface.

11. A lathe assembly comprising:

a base unit having first and second longitudinal ends,

a headstock assembly provided adjacent said first longitudinal end of said base unit, said headstock assembly including a spindle housing having a spindle shaft extending therethrough,

a first lathe bed assembly provided on said base unit and including a bedway extending longitudinally in a direction parallel to said longitudinal axis of said spindle for slidably receiving at least one of a tool rest and a tailstock; and

a second lathe bed assembly detachably coupled to at least one of said first and second longitudinal ends of said base unit, said second bed assembly including a second bedway for selectively receiving at least one of a tailstock and a tool rest assembly.

12. A lathe assembly as in claim 11, further comprising a second base unit mounted to and supporting a longitudinal end of said second lathe bed assembly remote from said first base unit.

13. A lathe assembly as in claim 11, wherein a longitudinal end of said second lathe bed assembly remote from said first base unit is substantially unsupported.

14. A lathe assembly as in claim 11, further comprising a first tailstock assembly selectively slidably disposed in said first bedway, said first tailstock assembly including a quill housing portion having a quill assembly rotatably disposed therein and axially aligned with said spindle shaft of said headstock assembly, and

wherein at least one of the quill housing portion of the first tailstock assembly and the spindle housing of the headstock assembly is generally elliptically shaped in longitudinal section and generally circularly shaped in transverse cross section so as to define a generally continuously curved outer peripheral surface.

15. A lathe assembly as in claim 11, further comprising an indexing assembly for angularly positioning and holding said spindle shaft with respect to said spindle housing at any one of a plurality of intervals, said indexing assembly including an indexing component fixedly secured to said spindle shaft and an indexing pin mounted to said spindle housing of said headstock assembly, and spring urged toward engagement with said indexing component.

16. A lathe assembly comprising:

a first base unit having first and second longitudinal ends and including a first lathe bed assembly having first and second longitudinal ends and a first bedway defined therein for slidably receiving at least one of a tool rest assembly and a tailstock assembly;

a headstock assembly mounted to said base unit, said headstock assembly including a spindle housing portion having a spindle shaft rotatably disposed therein;

a first tailstock assembly selectively slidably disposed in said first bedway, said first tailstock assembly including a quill housing portion having a quill assembly rotatably disposed therein and axially aligned with said spindle shaft of said headstock assembly; and

a locking assembly for selectively locking said first tailstock assembly to said first bedway,

wherein at least one of the quill housing portion of the first tailstock assembly and the spindle housing portion of the headstock assembly is generally elliptically shaped in longitudinal section and generally circularly shaped in transverse cross section so as to define a generally continuously curved outer peripheral surface.

17. A lathe assembly as in claim 16, further comprising a second lathe bed assembly detachably secured to one of said first and second longitudinal ends of said first lathe bed assembly.

18. A lathe assembly as in claim 17, further comprising a second base unit mounted to and supporting a longitudinal end of said second lathe bed assembly remote from said first base unit.

19. A lathe assembly as in claim 17, wherein a longitudinal end of said second lathe bed assembly remote from said first base unit is substantially unsupported.

20. A tool rest assembly for a lathe apparatus having a lathe bed assembly, said tool rest assembly comprising a tool support housing extending vertically from a tool rest main body, said tool rest main body comprising a tool rest housing and a locking assembly for selectively locking

said tool rest housing to the lathe bed assembly, said locking assembly including a locking plate for engaging an undersurface of a bedway of the lathe bed assembly; a slider block seated and disposed within said tool rest housing, a non-circular locking shaft extending longitudinally of said housing and disposed through a bore in said slider block, and a locking piston vertically slidably disposed in said slider block, said locking piston having a bore for being aligned with said bore of said slider block to receiving said locking shaft and having a shaft for being detachably mounted to said locking plate, whereby rotation of said locking shaft about the longitudinal axis thereof lifts said locking piston and the locking plate mounted thereto while pressing said block so as to clamp said housing to a bedway between the slider block and the locking plate.